

X. *Notes on Lepidoptera from the region of the Straits of Gibraltar.* By JAMES J. WALKER, R.N., F.L.S.

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THE following remarks on the Lepidoptera observed by me on both sides of the Straits of Gibraltar must not be regarded as at all exhaustive of the subject, but rather as indicating merely a fragment of the entomological riches of a region which, though of limited extent, comprises portions of the continents of Europe and Africa, and moreover presents some interesting features in the relative distribution of the insects and other living things on each side of the narrow channel which separates these two great masses of land. It is in the hope of adding a little to the knowledge of the Natural History of one of our most interesting and valued British possessions, and of the country in its immediate vicinity, as well as of their affording some little assistance to any entomologist who, like myself, may have the good fortune to be located for a time at Gibraltar, that I offer these field-notes, with a brief description of my principal hunting-grounds in the region.

From October, 1886, to April, 1889, I was attached to H.M.S. 'Grappler,' stationed at Gibraltar, and naturally my chief collecting-ground was on "the Rock" itself, and the adjoining Spanish territory within easy walking distance. I was mainly occupied in making as complete a collection as possible of the Coleoptera of the district, and as several other orders of insects, as well as the land-mollusca, claimed a share of my attention, the Lepidoptera cannot be considered as at all thoroughly worked out. The necessary military restrictions of so important a fortress prevent any collecting at night, except almost in the town itself, and as all communication with Spain is cut off half-an-hour after sunset every evening by the closing of the barrier-gates, no entomological work is practicable outside after that time.

These circumstances render the present list of the nocturnal groups of *Lepidoptera* a mere fraction of what may reasonably be supposed to exist in so varied a district, though, among the butterflies and the day-flying moths, I think but few have been overlooked.

The great Rock itself, a huge wedge-shaped mass of ancient grey limestone rising abruptly on all sides to a height of little short of 1400 ft., is, on its northern and eastern aspects, quite precipitous and inaccessible; and the steep and arid western and southern slopes, exposed to the full force of the afternoon sunshine, and but scantily covered, except in a few favoured spots, with brushwood and herbage, do not hold out any great promise to the entomologist, or to the naturalist generally. Nevertheless the flora, especially in the spring months, is of singular beauty and interest. The exhaustive 'Flora Calpensis' of Dr. Kelaart (London, 1846) enumerates no fewer than 452 species of flowering plants (one or two of these, so far as Europe is concerned, being peculiar to this little spot) as native to the British territory, and to the narrow sandy isthmus which joins the Rock to the mainland, up to the boundary of the Spanish lines. Insects, too, are to be found in considerable variety, and of the 63 species of butterflies enumerated in these notes, 35 have been observed more or less abundantly on the Rock itself. Of these, *Melitæa aurinia*, var. *Desfontainei*, Godt., and *Anosia plexippus*, L. (the latter represented by a solitary individual, which had wandered hither, possibly, directly across the ocean from its transatlantic home), have been observed by me in this locality only, and this is also the single spot on the European side of the Straits where I have seen *Charaxes Jasius*, L. This last-named butterfly, however, will probably be found in the district not uncommonly, as its food-plant, *Arbutus unedo*, L., is said to grow abundantly in the wooded ravines near Castellar de la Frontera, 17 miles from Gibraltar, whence the fruit is regularly brought to the Gibraltar market by the country-people; and I have also seen the shrub in the woods behind Algeçiras, where several very interesting plants as *Rhododendron ponticum*, L., the "insectivorous" *Drosophyllum lusitanicum*, and the noble fern *Dicksonia culcita*, L. Heritier, have almost their sole European station.

For some five or six miles from the Rock the country is rather bare and monotonous, the roads and cultivated patches being hedged with the prickly pear (*Opuntia vulgaris*) and the *Agave Americana*, both of which New World plants thrive as well here as in their native continent; and except for a few fruit-gardens near the small town of Campamento ( $3\frac{1}{2}$  miles from Gibraltar), trees are conspicuous by their absence. The isthmus which joins the Rock to the mainland is level and sandy, and not more than ten feet above the sea in any part; and beyond the wretched village of San Felipe de la Linea, just within the Spanish lines, a broad belt of bare sand-hills extends from the Mediterranean beach to that of Gibraltar Bay. These merge gradually into the slopes of the Sierra Carbonera, a range of sandstone hills about 1000 ft. high, running north and south for several miles. Although these hills are now bare of everything except scanty brushwood and the usual aromatic herbage of the Mediterranean region, they are said to have been formerly covered with cork and other trees, which were cut down at the time of the great siege of Gibraltar (1779—1782): a few of the characteristic cork-wood insects (*Lycæna melanops*, *Fidonia plumistaria*, &c., still linger on these hills, as if to bear witness to their former wooded condition. After passing the town of San Roque the country becomes much more varied and luxuriant, though still somewhat arid and sandy in places; and, commencing at nine miles from the Rock, on approaching the valley of the small river Guadarranque, which falls into Gibraltar Bay half-way between Gibraltar and Algeçiras, the fine cork-woods of Almoraima extend for many miles on both sides of the stream, and afford by far the most interesting and productive collecting-ground in the district. Almost equally good ground, of a somewhat similar character, is to be found about four miles inland from Algeçiras, on the lower slopes of the Sierra de la Luna, a range of rugged sandstone hills attaining a height of more than 2000 ft.; but I was able to visit this part on but few occasions, while my almost weekly excursion on foot to the cork-woods during the summer months was invariably a highly enjoyable and successful day's work.

To complete the account of the Spanish localities, the 'Grappler' made two flying visits of three or four days'

duration to Malaga in April and May, 1888. The weather on each occasion was not very favourable, and not much available collecting-ground was to be found; the country west of the town being a flat, alluvial, highly-cultivated plain for the most part, while on the east side the slopes of the rugged limestone hills are almost entirely occupied by vineyards. A considerable number of species of insects was, however, obtained, including several that were either very rare in, or absent from, the Gibraltar district, *Euchloë tagis*, var. *bellezina*, E., and *Pararge mæra*, L., being observed here only.

Passing next to the African side of the Straits, almost exactly opposite "Mons Calpe" at a distance of 13 miles, the second Pillar of Hercules, "Mons Abyla," the modern Djebel Mousa, or "Ape's Hill," rises as a huge rugged dome-shaped mass of limestone (not distinguishable, in hand specimens, from that of Gibraltar) to a height of 2808 ft. I had the good fortune to be enabled to ascend this mountain, from Almanza Bay, on November 4th, 1888, a gloriously clear day, when the view from the summit was one never to be forgotten. The 'Grappler' visited on several occasions a little indentation of the coast called Benzús Bay, about five miles west of Ceuta, and at the foot of the main mass of the mountain: here a rugged and stony, but fertile valley, watered by perennial springs in the limestone, is cultivated by an industrious and peaceable community of Moors, who obtain two and sometimes three crops of wheat, maize, and "dhourra" (*Holcus sorghum*, L.) in the year. A number of interesting insects, not observed at all on the European side, occur at this place. Indeed, the difference between the faunas on the two shores, when the narrowness of the channel separating them and the comparatively recent date which geologists agree in assigning to its formation are taken into account, appears worthy of special attention. The great depth of the Straits (503 fathoms between Gibraltar and Benzús), and the constant strong current from the Atlantic into the Mediterranean, no doubt render them a much more formidable barrier to the passage of living creatures from side to side than would appear at first sight. Although one of the great migration routes of birds actually crosses this narrow sea, there are several species which come right up to its southern shore, and proceed



no farther. Of these the elegant little black-winged kite, *Elanus caeruleus*, Desf., the conspicuous bush-shrike, *Telephonus erythropterus*, Shaw, and *Ixus barbatus*, Desf., the last bird being abundant and somewhat destructive in the orange-orchards of Tangier and Tetuan, may be instanced; but perhaps the most singular case is that of the two ravens, the well-known *Corvus corax*, L., being found sparingly on the European side only, while the smaller and very distinct *C. tingitanus*, Irby, replaces it at Tangier (where it is abundant) and elsewhere in Marocco, but appears never to cross the Straits. It is true that the partridge, *Caccabis petrosa*, Gmel., so common in Marocco, occurs on the Rock of Gibraltar, as does also the monkey, *Macacus inuus*, L., but it is more than probable that both these creatures were originally conveyed there by human agency; the ape is found, in a truly wild state, on the Djebel Mousa. In the land-shells also the same difference is noticed, those from the Djebel Mousa, though closely allied to the Gibraltar species, being mostly distinct; the fine and rare *Helix Scherzeri*, Zélébor, however, seems confined to the summits of the mountains, and *H. Tarnieri*, Morelet, abundant at Tangier, reappears sparingly at Algeçiras and Tarifa. Among the butterflies, *Euchloë eupheno*, L., *Thestor mauritanicus*, Luc., *Lycæna Theophrastus*, F., *Cænonympha arcantioides*, Pierr. (which comes down to the beach at Benzús Bay), and *Pamphila Zelleri*, Led., appear to be confined to the Moroccan portion of the region, while *Euchloë euphenoides*, Stgr., is an instance of a common Spanish insect which does not cross the Straits. In the Coleoptera, the species which are more or less common on one side, and are apparently not found at all on the other, are too numerous to mention.

Tangier was visited pretty frequently, though never for more than two or three days at a time, and mostly in the winter months: I noted upwards of 30 species of butterflies as occurring there, the most interesting being *Thestor mauritanicus*. Many more probably exist there, as the country is favourable for collecting, and even more varied than that near Gibraltar. To the west of the town, in the direction of Cape Spartel, are undulating downs, attaining in the Djebel Kebir a height of nearly 1200 ft., and covered with a dense uniform "scrub" of aromatic herbs and bushes, among which

the lovely white-flowered *Cistus ladaniferus*, L., is most conspicuous in the early months of the year. The reed-fences enclosing the few cultivated spots support great festoons of *Aristolochia*, *Clematis*, *Smilax*, *Bryonia*, and other climbers, from which many moths may be beaten, and the tall *Eucalyptus* trees in the gardens on "Mount Washington," the hill nearest Tangier in that direction, are, in September, the favourite resort of *Charaxes jasius*. On the eastern side of Tangier the shores of the Bay are fringed with sand-hills, supporting a scanty growth of *Retama*, &c., and strips of salt-marsh: these rise into low clay hills, with massive fragments of ancient buildings (relics of the old Carthaginian city of Tingis) scattered over them; in part cultivated and strewn with innumerable loose stones, beneath which, in the winter and early spring months, a varied and most interesting coleopterous fauna has its habitat. There is, however, little or no wooded country within walking distance of Tangier, and, owing to limited time and other causes, I did not on any occasion go more than five miles from the town.

From Cape Malabata (the eastern boundary of Tangier Bay) to Benzús the southern shores of the Straits appear somewhat barren and uninviting, and I had no opportunity of landing at any point except once or twice at Almanza Bay, which in general resembles that of Benzús in character, with the addition of a good-sized stream in the valley. The Spanish town and peninsula of Ceuta, which bears a remote resemblance to Gibraltar, though very far inferior in grandeur, was visited by me only on one occasion, when I saw no insects worthy of notice.

Southwards from Ceuta to the mouth of the Bus-feka or Kús River, a distance of about 20 miles, the shore of the Mediterranean Sea is for the most part flat and sandy, with low marshy land between the beach and the hills, which about 6 miles inland attain an elevation of over 2500 ft. A spur of these hills terminates to seaward in the fine bold promontory of Cape Negro, the vertical cliffs of which are over 600 ft. high. Just to the north of Cape Negro is the extensive plain of Buzaghal or Esmir, comprising several square miles of marsh and lagoon, shut off from the sea by a strip of sand-hills about 150 yards wide, through which, in the winter, the

surplus water of the marsh cuts its way in a deep and almost impassable torrent. There is good anchorage (but only in westerly winds) about half-a-mile from the shore, and we made many trips to this spot in the 'Grappler' for the purpose of shooting wild-fowl. This great marsh, covered with dense beds of reeds, bulrushes, and other aquatic plants, and with tangled thickets of tamarisk here and there, is a perfect paradise for water-birds. The open waters of the lagoon are in winter blackened with multitudes of the commoner kinds of ducks, and with two species of coots (*Fulica atra*, L., and *F. cristata*, L.): in autumn the starlings congregate here in flocks of hundreds of thousands, the sound of their wings, heard at a distance of a mile or more, being like that of the surf on a beach; while among the less common birds the elegant marbled duck (*Anas angustirostris*, Mén.), the purple heron (*Ardea purpurea*, L.), the glossy ibis (*Plegadis falcinellus*, L.), and the brilliantly coloured purple gallinule (*Porphyrio cæruleus*, Vand.) find a secure breeding-place among the tangled reed-beds. Once or twice, too, I have here seen the majestic white heron, *Ardea alba*, L., a very rare bird in these parts. As our visits were naturally mostly made in the winter, I did not meet with many Lepidoptera here, but the Coleoptera were always most abundant, and included many of the finest and most interesting forms which I met with in the whole region.

There is a somewhat similar marsh to the southward of the Cape Negro promontory, extending on both sides of the Kús River nearly up to the town of Tetuan, six miles distant from the sea; but this marsh, being more saline in character, is on the whole much less productive in insects than Esmir. To the south and east of Tetuan, the "Riff Coast," of piratical renown, remains practically a *terra incognita*, the fierce and fanatical character of the inhabitants rendering it very dangerous for a Christian to venture among them. A few miles inland the fine range of the Beni Hassan or "Lesser Atlas," whose highest summit, a sacred mountain of the Mohammedans, is partly covered with forest and considerably exceeds 7000 ft. in elevation, will no doubt afford many fine insects when explored, but I believe that up to the present time no European has ever set foot upon it.

I now proceed to enumerate the *Lepidoptera* met with:—

*Papilio podalirius*, L. — I have never seen this insect in the vicinity of Gibraltar, but at Malaga, on May 1st, 1888, I took a very fine female specimen of the var. *Feisthameli*, Dup. The var. *Latteri*, Aust., appears to be not uncommon on the African side of the Straits: I have met with it at Esmir in July, and at Benznús Bay and Tangier in August and September.

*P. machaon*, L.—Very common everywhere on both sides of the Straits; I have taken freshly-emerged specimens on the Rock of Gibraltar from February 18th to the end of October. The larva is, so far as I have observed, as frequently found on rue (*Ruta angustifolia*, Pers.) as on fennel and other *Umbelliferae*.

*Thais rumina*, L. — This beautiful butterfly is one of the most characteristic species of the Rock, where it abounds in early spring; it is found throughout the district, being common close to the town of Malaga, and abundant at Tangier. A favourite haunt for the species at Gibraltar is the bush-covered slope at the back of the "Alameda," or public garden, where, in May and June, the curious larvæ may be found commonly on *Aristolochia glauca*, Desf. The earliest date on which I have observed the imago on the wing at Gibraltar is February 8th, and it lasts in good condition until the end of April. The ab. *Canteneri*, Hey., was seen only on April 13th, 1887, on the summit of Peregil Island, a curious little flat-topped limestone rock of about two acres in extent and 250 ft. in elevation, lying about a quarter of a mile from the African shore, almost exactly opposite the Rock of Gibraltar.

*Pieris brassicae*, L. — Common everywhere throughout the year. As a rule the specimens are rather smaller than those met with in England, the apex of the primaries is less densely black, and the under side of the secondaries much more dusky in tone, through being more thickly sprinkled with black scales. The larva is very common on *Tropæolum*, as well as on *Cruciferae*, at Gibraltar.

*Pieris rapæ*, L.—As common as the preceding, and also on the wing all the year round. Somewhat smaller on the average than British examples, but not otherwise

different. (*P. napi*, L., is said to occur both at Gibraltar and Tangier, but I did not meet with it.)

*P. daphnidice*, L.—Also a generally common insect, but most numerous in the cork-woods of Almoraima, beyond San Roque, where it flies from March to November; on the Rock of Gibraltar I have taken it as early as January 18th. The larva is found on *Biscutella microcarpa*, DeC., and other *Cruciferae*.

*Euchloë belemia*, E. — Common in open sunny places throughout the whole region, especially at Gibraltar and the adjacent Spanish district. This butterfly is often to be seen on the wing on fine days even before Christmas (it was common at Tangier on December 9th, 1887), but is most plentiful in February and March. About the end of April the second brood (ab. *glauca*, Hb.) appears, and lasts until the middle of June. It has a very strong, swift, and erratic flight, and is by no means easy to catch. The beautiful pink-striped green larva is found not rarely on *Biscutella* and other *Cruciferae* (of which it prefers the flowers) in April.

*E. belia*, E.—Only once found on the Rock of Gibraltar, and quite rare in the adjoining district, where, however, I have seen it as early as January 28th. At Malaga I found it fairly common at the beginning of April, 1888, but I did not observe it at all on the African side of the Straits. The var. *Ausonia*, Hb., was taken at San Roque on March 31st, and at Malaga on April 30th, 1888.

*E. tagis*, E.—Very common in sunny open spots in the cork-woods in March and April, but not observed elsewhere, except at Malaga, where I found the var. *bellezina*, E., rarely at the beginning of April, 1888. First seen on the wing March 26th, 1887; in its flight it is similar to *E. belia*.

*E. cardamines*, L. — This species is reported to be not rare in the cork-woods, but I met with it there on only one occasion (April 8th, 1887), when it was quite scarce. The three males then taken are large and fine, but differ very slightly, if at all, from British specimens.

*E. eupheno*, L.—Restricted to the African side of the Straits, where it replaces *E. euphenoides*, Staud., and is not rare at Tangier and Benzús Bay; I have taken it as early as March 10th at the first-mentioned locality



Its flight is much more powerful than that of its near ally.

*E. euphenoides*, Staud.—Only found on the European side of the Straits; it is common on the Rock of Gibraltar and at Malaga, and in the cork-woods it forms quite a feature in the scenery on a fine sunny day at the end of March, flitting quietly from flower to flower among the brushwood. The females of this and of the preceding species are much less numerous, or at all events less frequently seen, than their mates; I should put the proportion at about three males to one female observed. The earliest date of its appearance is March 11th (on the Rock), and it remains on the wing until the end of April. The larva I frequently swept off *Biscutella* in May.

*Leucophasia sinapis*, L.—A common insect in the cork-woods, but not observed anywhere else; it first appears at the end of March (26th), and successive broods occur up to the end of July. It varies greatly in size, as well as in the development of the black apical spot of the primaries, the late summer specimens being very small and faintly marked.

*Colias edusa*, F.—This is perhaps the most abundant butterfly throughout the entire region, and there is scarcely a fine day in any month on which freshly-emerged specimens may not be seen on the wing. The autumn and winter broods, as a rule, are smaller, paler in colour, and with narrower dark borders than the spring and summer insects. The smallest male specimen I possess, however, was taken at Gibraltar in June, 1887, and measures exactly  $1\frac{1}{2}$  in. (38 mm.) in expanse. The next in size, also a male (Gibraltar, February, 1887), measures 1 in.  $7\frac{1}{2}$  lin. (41 mm.), and the smallest female (Gibraltar, December, 1889) is 1 in. 10 lin. (46 mm.). The largest male, taken at Algeciras in June, 1888, is a singularly fine deeply coloured specimen, with abnormally wide and dark borders; this expands 2 in. 3 lin. (57 mm.), and a fine example of the ab. *helice*, Hübn., from San Roque (June, 1888) measures 2 in. 4 lin. (59 mm.). Compared with British specimens, the greater depth and richness of colour of the summer broods of *C. edusa* from the Straits region is very noticeable, and some of the females are very darkly suffused at the bases of the primaries. The ab. *helice*, Hübn., is fairly common, mostly

so in June and forms intermediate between it and the type are occasionally met with. On November 22nd, 1886, I took a very beautiful "gynandromorphous" specimen in the cork-woods, having the right wings male and the left female; this was flying among numerous examples of the ordinary form, apparently, like it, only just emerged from the pupa. On June 6th, 1888, the abundance of this butterfly on the Rock of Gibraltar was so great as to attract general attention, it being visible by hundreds, even in the main street of the town. I have often found and reared the larvæ on species of *Lotus*. (*C. hyale*, L., though well looked out for, did not put in an appearance; it certainly should occur in the region.)

*Gonepteryx rhamni*, L. — Not seen on the Rock of Gibraltar, but common at San Roque and Algeçiras, also at Tangier, flying with *G. cleopatra*; very large and fine, the males averaging 2 in. 8 lin. (68 mm.) in expanse. First observed June 4th, also in March and April after hibernation.

*G. cleopatra*, L.—Abundant on the Rock and throughout the Gibraltar district, as well as on the African side of the Straits at Tangier, Benzús Bay, &c.; in May, June, and July, also in early spring (from February 17th) after hybernation. I have taken fresh specimens (in 1887) at San Roque as early as April 30th.

*Thecla spini*, Schiff.—Not a rare species in the cork-woods; also on the steep bushy slope of the Rock above the Alameda, where it frequents the flowers of a species of *Sedum* (*altissimum*, Poir.), which grows there in plenty. The ab. female *lynceus*, Hübn., is much more common than the type. First seen in the cork-woods, May 14th, 1887.

*T. ilicis*, E. (var. *æsculi*, O.).—Very abundant in the cork-woods, and also observed at Benzús Bay and Tangier, but not on the Rock of Gibraltar. It flies over the low bushes, and is partial to the flowers of *Scabiosa*, from which it may be taken with the fingers. First observed 14th May, 1887, and lasts until the end of June.

*T. roboris*, E.—I have only met with this beautiful little butterfly on two or three occasions in the cork-woods, where, in June, it flies round the tops of the tall oaks (*Quercus lusitanica*), usually well out of reach of

any ordinary net ; but I have taken the female on flowers in company with *T. spini* and *T. ilicis*. The earliest date on which it was observed is May 31st.

*T. quercus*, L. — Another somewhat scarce species in the Gibraltar district, having been taken sparingly on *Quercus lusitanica* in the stone-pine plantation (commonly known as the "First Pine Wood") about a mile north of San Roque. First seen July 7th, 1887.

*T. rubi*, L. — Common near San Roque (apparently not found on the Rock), also at Tangier. At the former locality I have observed it on February 28th ; it is quite over by the first week in April.

*Thestor ballus*, Hübn. — Generally abundant ; at Gibraltar it is to be found in March and April in waste flowery places and on the glacis of the fortifications, and it is equally common at Malaga and Tangier. It is very active on the wing, the male especially, and is partial to the flowers of *Fedia cornucopiæ*, DeC., one of the *Valerianææ* which abounds on the Rock. The male occurred in 1888 as early as February 7th ; the female has not been seen before March 9th.

*T. mauritanicus*, Lucas. — I had the good fortune to meet with this rare and curious little butterfly on April 1st, 1887, at Tangier, when I found it common, but getting somewhat worn, in an exceedingly restricted locality about two miles south-west of the town, near the Guadalhorce or "Jew's River." I again found it in 1888 on March 10th, and in 1889 on March 23rd, in the same spot—a space not 30 yards square, beyond which not one was to be seen, in the midst of miles of precisely similar scrub-covered country. The male flies close to the ground, and for a short distance only at a time, much less rapidly than its congener *T. ballus* : it invariably settles on the bare spots of ground among the low bushes, where it is easily caught. The female is either much scarcer, or flies less readily than the male, as I have taken only one female to about seven males.

*Polyommatus phleas*, L. — Very abundant everywhere throughout the year, especially the summer form *eleus*, F. ; the autumn and winter specimens are very brightly coloured, the var. *eleus* being met with from April to September.

*Lycæna bœtica*, L. — Common almost all the year throughout the Straits region, being often seen in the

Alameda at Gibraltar. I have records of its appearance from February 28th to October 30th.

*L. telicanus*, Hübn.—More abundant than the last, and generally distributed; it is very plentiful in the marshy hollows or “sotos” in the cork-woods, and on the borders of the Esmir lagoon in Marocco. March 26th to the end of October.

*L. theophrastus*, F.—I met with one female specimen of this pretty little insect (of which I can find no previous record from Marocco) on the borders of the lagoon at Esmir, on July 25th, 1888.

*L. baton*, Berg., var. *panoptes*, Hübn.—Fairly common in May, 1888 (first observed on the 8th), on the lower slopes of the Sierra Carbonera, about two miles from the Rock of Gibraltar, frequenting dry flowery banks. I did not see it elsewhere, nor did I meet with the type-form.

*L. lysimon*, Hübn.—Scarce near Gibraltar; I took a few rather worn specimens in a sandy waste field at Campamento, three miles from the Rock, on August 17th, 1887. I have also met with it at Esmir and near Tetuan, Marocco, in November.

*L. astrarche*, Berg.—Very common everywhere, almost all the year round; I have seen it on the wing on February 21st. Rather larger and brighter than English specimens, the orange spots always very well marked (especially in the female), and the ground colour of the under side of the wings warm ochreous-brown.

*L. icarus*, Rott.—Exceedingly abundant and very variable in size and colour. Some of the males are very bright, and have a submarginal row of small black dots on the upper side of the secondaries; the females, as a rule, are much more blue above than English specimens. In the middle of summer very small examples occur, not exceeding  $8\frac{1}{2}$  lin. (18 mm.) in expanse, the males having a series of faintly indicated submarginal orange dots on the upper side of the secondaries, the females very dark, with little or no blue. Flies from February 12th to November. The var. *icarinus*, Scriba, occurs rarely.

*L. bellargus*, Rott.—Found rarely near San Roque (April 30th, and again in July, 1887) also at Malaga. Summer specimens of the male have a submarginal row of bright orange dots on the upper side of the secondaries.

*L. argiolus*, L.—Generally common; I have seen it on

the Rock (where the larva may be found on the blossoms of ivy) as early as January 12th, but it is most plentiful in June and July.

*L. minimus*, Fuess., var. *Lorquinii*, H.-S. — Only met with by me on one occasion (May 16th, 1887), when I took a few examples of both sexes in beautiful condition, in a ravine close to the shore of Cabrita Point, about two miles south of Algeçiras.

*L. melanops*, Bdv. — Locally abundant in open places in the cork-woods, where its food-plant, *Dorycnium suffruticosum*, grows; also on the Sierra Carbonera near San Roque, and at Malaga. It frequents the flowers of various species of *Erica*, and is on the wing from April 12th to the middle of May.

*Charaxes jasius*, L. — I have only twice seen this noble butterfly on the European side of the Straits, on both occasions in the Alameda at Gibraltar, on June 2nd and October 7th, 1888. At Tangier, in September of the same year, it might almost have been called abundant in the lanes and gardens to the west of the town, beyond the "Jew's River." It is a grand sight to see three or four of this splendid insect wheeling round the top of a tall "blue-gum" tree, occasionally, though but seldom, descending to alight on a twig within reach of the net, though even then it is not easy to approach. Over-ripe figs are, however, a great attraction to it. The largest and finest female I obtained (measuring 4 in. 3 lin. = 108 mm. in expanse) was taken on the stem of a plum-tree from which a little gum was oozing. I did not meet with the larva at Tangier, as I was too busy with Coleoptera to look for it when it was feeding in early spring; the food-plant, *Arbutus unedo*, L., abounds near Tangier, but is not found within many miles of Gibraltar. I have taken the butterfly (much worn) at Benzús Bay on August 28th, and have seen it at Esmir in October. It also occurs at Ceuta.

*Vanessa polychloros*, L. — Not common; taken at San Roque on June 9th, 1887, also met with on the Rock of Gibraltar, and in the Alameda at Algeçiras. On the African side I have seen it at Benzús Bay. It is rather more plentiful after hibernation in March and April.

*V. atalanta*, L. — Generally common, but not abundant, throughout the entire region. Flies all the year round.

*V. cardui*, L. — Very plentiful everywhere during the



summer, and fresh specimens are occasionally to be met with in the winter months; these are usually small and very darkly coloured.

*Melitæa aurinia*, Rott., var. *Desfontainii*, Godt.—I shall not readily forget my astonishment at meeting with this butterfly—for which I had been vainly scouring every accessible marshy place for at least ten miles round—on a steep, arid, bushy slope of the Rock of Gibraltar, within a stone's throw of the main road, and barely 300 yards from the town walls. I first saw it on May 27th, 1888, and managed during the following week to obtain a small series, not without a good deal of trouble, as the insect flies very strongly, and the nature of the ground it frequents renders its pursuit a matter of difficulty. It is not easy to realise that these large richly-coloured insects (my largest female measures in expanse of wing 2 in.  $3\frac{1}{2}$  lin. = 57 mm.), and the little pale washed-out looking alpine *merope*, Dup., of which I have specimens barely 1 in. 3 lin. (= 34 mm.) in expanse, are but forms of one variable species.

*M. phæbe*, Kn., var. *ætheria*, Hübn.—Common in the cork-woods, frequenting the same localities as *Lycæna melanops*, and on the wing at the same time, from April 30th to the end of May. No second brood observed. The specimens are very fine and large, averaging 2 in. 2 lin. (= 55 mm.) in expanse.

*Argynnis latona*, E.—Apparently very rare; I took one specimen by the roadside at Campamento on June 18th, 1887, and have seen one or two more caught near San Roque.

*A. pandora*, Schiff.—Very sparingly observed in the cork-woods (May 28th, 1887), and near San Roque (July 7th, 1888); also taken at Benzús Bay in August, and seen at Tangier in September. It must, however, be common somewhere in the neighbourhood of Gibraltar, as on September 19th, 1888, quite a large number suddenly appeared on the Rock after the prevalence of a fresh westerly breeze, and were seen for a fortnight afterwards, frequenting flowers of heliotrope, &c., in the Alameda. All were males, so far as I could ascertain, and all in exceedingly worn condition.

(*Anosia plexippus*, L.).—This wandering butterfly was taken by Lieut.-Commander Cochran, of H.M.S. 'Grappler,' in his garden at Rosia, Gibraltar, on October 24th,

1886 (*vide* Entom. Monthly Mag., vol. xxiii., p. 162), and was seen shortly afterwards by me, it being then only just dead. I kept a special look-out for it during the whole of my stay at Gibraltar, but did not see or hear of another specimen.

*Melanargia ines*, Hfsgg. (*thetis*, Hübn.).—Only one specimen of this pretty species, a female in very fine condition, taken in the cork-woods on May 21st, 1887. I saw it commonly at Malaga when I was there in H.M.S. 'Swiftsure' in April, 1876, and on my visit to the same place in May, 1888, obtained a few beautiful specimens (all males) on a bare limestone hill-top about two miles east of the town. It is said to occur abundantly at Gaucin, 25 miles north of Gibraltar.

*Satyrus statilinus*, Hufn., var. *allionia*, F.—Abundant in the stone-pine plantations beyond San Roque, and in the cork-woods, but not found on the Rock of Gibraltar; in Marocco I have observed it at Benzús Bay. It is very fond of settling on the trunks of the cork-trees, and is to be taken in good condition from July 2nd to the end of August. I have seen worn stragglers in the cork-woods as late as October 29th. Usually very large and well-marked, averaging 2 in. 6 lin. (= 63·5 mm.) in expanse of wing.

*S. fidia*, L.—This fine species is very common on the Rock of Gibraltar, being often seen on the main road settled on horse-droppings, or coming down from the slopes above when the road is watered, as it is every day about 3 p.m.; it is then most easily taken, as the ground it usually frequents is very rough and impracticable. The specimens are larger and finer than those I have seen from South France, the female often attaining an expanse of wing of 3 in. (= 76 mm.). The earliest date on which I have observed it (in 1888) is June 16th, and it continues on the wing until the end of August. I have taken it sparingly in the cork-woods, and in Marocco at Benzús Bay. Its flight is powerful, and it is rather shy.

*Pararge mæra*, L., var. *adraste*, Hübn.—Only met with at Malaga, and there but rarely, on April 5th, 1888.

*P. megera*, L.—Very abundant everywhere throughout the Straits region, and on the wing almost all the year round; I have notes of its appearance from January 28th to the end of October. Perhaps slightly paler

in tone than British examples, but not otherwise different.

*P. ægeria*, L.—As plentiful as the last species, and found everywhere throughout the year. Always of the dark type-form, which I have also taken at Ferrol, on the north coast of Spain.

*Epinephile janira*, L., var. *hispulla*, Hübn.—Abundant everywhere in the open country from May 7th to the end of August. The type-form not met with.

*E. ida*, E.—One of the commonest butterflies, frequenting open bushy places throughout the region. First observed May 12th, 1887, and I have seen the females in good condition in the middle of September.

*E. pasiphaë*, E.—Also very common and generally distributed, and found in the same situations as the last; it abounds on the slopes of the Rock of Gibraltar (where I have observed it on April 25th) at San Roque, Malaga, Tangier, and Benzús Bay. Unlike *E. ida*, it lasts but a short time, being quite over by the middle of June.

*Cænonympha arcanioides*, Pierret.—Found only in Marocco, where it is common throughout the summer in dry bushy situations. At Tangier I have taken it as early as March 10th; it also occurs at Esmir and Benzús Bay.

*C. dorus*, E.—Locally common on the downs beyond San Roque, and on open hill-sides in the cork-woods; also at Benzús Bay, but apparently rare there. June 24th to the end of July.

*C. pamphilus*, L.—Quite a rarity; found on the Rock of Gibraltar in May, 1887, and near Tetuan on June 20th, 1888. Both these specimens are richly marked, and the Tetuan example has well-defined dark borders to all the wings above, but they do not exceed English examples in size.

*Spilothyrus alceæ*, E.—Rare. Taken near Cabrita Point, May 16th, and at San Roque on June 18th, 1887.

*S. althææ*, Hübn.—Common everywhere almost all the year. Taken on the glacis of the fortifications at Gibraltar on March 14th, 1888, and as late as November 20th at San Roque.

*Syrichthus proto*, E.—Very common and generally distributed. There appear to be two broods, the first appearing in May (10th), the second, which is more numerous, in July, and continuing on the wing until the

end of September. The larva was found plentifully at Malaga at the end of April, 1888, between united leaves of *Phlomis purpurea*, L.

*S. fritillum*, Hübn.—Locally common in a waste field by the side of the main road between Campamento and San Roque, but not seen elsewhere. First found July 13th, 1887, and again on May 22nd of the following year.

*S. sao*, Hübn., var. *therapne*, Rbr.—Common near San Roque in dry waste places, frequenting the flowers of thyme, &c. ; also sparingly in the cork-woods, at Tangier, and at Esmir. Double-brooded, appearing in April (16th) and May, and again in July, the second brood being the more common. I took a fine freshly-emerged example at Esmir as late as November 3rd, 1888.

*Hesperia thaumas*, Hufn. — Generally abundant throughout the Gibraltar district (except on the Rock, where I have never seen it), as well as at Tangier, in dry open places. May 10th to the middle of June.

*H. actæon*, E.—Also plentiful at Campamento, San Roque, and other places near Gibraltar, but not on the Rock, and I have no record from Marocco ; it is always found in damp situations. May 10th to the middle of June.

*H. nostradamus*, F.—Common in the Gibraltar district, being often taken on heliotrope flowers in the Alameda ; also at Tangier (where I first observed it on June 11th, 1887), Benzús Bay, and Esmir. It is most plentiful in August and September, and frequents the hottest and driest situations.

*H. Zelleri*, Lederer.—This little skipper is found only on the African side of the Straits. My first specimen was taken at Benzús Bay on August 30th, 1887, and I subsequently met with it in a damp spot among the sand-hills about a mile east of Tangier on September 19th, and again in some numbers on the edge of the Esmir lagoon on October 1st. In the following year I took it again at Esmir on July 25th, and in good condition as late as November 10th. The flight of this butterfly is much less rapid than that of its near ally, *P. nostradamus*, and it appears always to be found in moist places, or at any rate, never very far away from water ; at Esmir the yellow flowers of *Inula viscosa*, Ait., are its great attraction. The original record of this species (Lederer, Verh. Zool.-bot. Ges. Wien, 1855, p. 194) gives Syria as its habitat. I can find no record

from any other country, and its occurrence in so distant a locality as North Marocco is very interesting. Specimens of *H. Zelleri* in the National Collection agree in every particular with my insect.

*Smerinthus populi*, L.—I found the remains of this insect at Benzús Bay, May 5th, 1888; living examples were not met with.

*Acherontia atropos*, L.—Imago of occasional occurrence. Larvæ found once or twice by me at Gibraltar, on the thorny *Solanum Sodomæum*, Willd.

*Sphinx convolvuli*, L.—Apparently not common; occasionally found at flowers. I have only seen one or two specimens at Gibraltar.

*Deilephila euphorbiæ*, L.—Not seen in the perfect state, but the larvæ were not uncommon on the Neutral Ground at Gibraltar, and in the cork-woods. I have seen them in June and October.

*D. livornica*, L.—This species is said to be common in some summers at the flowers of *Plumbago capensis*, *Pelargonium*, &c., at Gibraltar and Tangier. I have only one specimen, however, from the former locality.

*Cherocampa celerio*, L.—Not uncommon in September and October at the flowers of *Plumbago capensis*, &c., at Gibraltar; also occasionally found at rest on walls, &c.

*Pterogon proserpina*, Pall.—I have not met with this insect in the perfect state, but the larvæ were found in considerable numbers near Campamento, on *Ænothera biennis*, in June, 1888.

*Macroglossa stellatarum*, L.—Abundant everywhere all through the year; I saw it commonly on the Rock of Gibraltar on Christmas Day, 1886, busily engaged at the wild flowers, of which I remember counting no fewer than thirty species in bloom on that day.

*Sciapterontabaniforme*, Rott.—Scarce. A fine pair taken on white poplar on the Rock of Gibraltar July 8th, 1887.

*Sesia Ramburi*, Staud.—Not very uncommon on the flowers of thyme, wild carrot, &c., on the downs beyond San Roque, in June.

*Paranthrene tineiformis*, E.—Found with the preceding, but much less common; also taken on the Rock of Gibraltar. June.

*Zygæna sarpedon*, Hübn.—Not common. Taken on the Sierra Carbonera, May 8th, 1888; also at Algeçiras and Benzús Bay in June.



*Z. stachadis*, Bork. — Locally plentiful in marshy places. Cork-woods, June 4th, 1887; Benzús Bay, June 25th, 1888.

*Z. lavandulæ*, E. — This very beautiful insect has occurred to me only in one little spot, a sunny bank about a mile north of the town of San Roque, on the way to the cork-woods. I found it here not uncommonly on May 7th, 1887, and again on May 10th, 1888. It flies rather actively in the bright morning sunshine.

*Z. bætica*, Ramb. — Exceedingly abundant in the Alameda of Gibraltar, and other places on the rock; also on the Neutral Ground. The larva feeds on the handsome yellow-flowered *Coronilla glauca*, frequently stripping the bushes of their foliage, and the moth is double-brooded. The specimens of the first brood, which appears in May (being observed on the 18th of that month in 1887), are much finer and larger than those of the more numerous second brood, which emerge in August and September. The cocoon is smooth, oval, and white, and not a little resembles a lizard's egg.

*Nola cicatricalis*, Treitschke. — One or two found on tree-trunks in the cork-woods in April, and at rest on lichen-covered boulders on the Rock of Gibraltar in October.

*Emydia cribrum*, L., var. *candida*, Cyrill. — Not uncommon. Taken on gas-lamps at Gibraltar, among grass at Campamento, and in heathy places in the cork-woods. May, and again in August and September.

*Deiopeia pulchella*, L. — Abundant everywhere, and to be met with throughout the year, though most plentiful in early summer. On May 14th, 1887, I saw it in vast profusion at the edge of the cork-woods, every step that I took disturbing scores of examples. Larva on *Heliotropium europæum*, *Echium*, and other *Boraginææ*.

*Euchelia jacobææ*, L. — Locally common near Campamento in June; the larva found in plenty on ragwort.

*Euprepia pudica*, L. — Occasionally found at rest at Gibraltar and Tangier. The larva is not uncommon, but it feeds up very slowly, and is not easy to rear. The imago appears in August and September.

*Arctia villica*, L. — Not common. Found near Campamento in March and April, and the larvæ and pupæ are occasionally met with in early spring. The specimens

are much larger and finer than English examples; they expand 2 in. 9 lin. (= 69.6 mm.).

*A. casta*, E.—I found only one example of this beautiful little tiger-moth, at rest on the ground near San Roque, on April 12th, 1888.

*Phragmatobia fuliginosa*, L.—Only observed in Marocco, at Esmir, and in the marshes near Tetuan, where the cocoons are to be found not uncommonly in the winter, spun up on the rushes. The specimens bred from these are remarkably large and brightly coloured, on an average measuring 1 in. 6½ lin. (= 39 mm.) in expanse.

*Orgyia Josephinæ*, Oberth. ('Etudes d'Entomologie, Lép. d'Algerie,' vol. 6, div. iii., p. 77, and plate ii., fig. 5, ♂).—This very beautiful and interesting species was described by M. Oberthür from specimens obtained at Lake Sebgha, in Algeria, by M. Austaut, in April, 1880. I found it at Esmir under the same circumstances as the preceding species, but only bred two males from a good many cocoons collected; the wingless females, which are covered with ashy-grey woolly hairs, appear to be much more numerous.

*O. trigotephros*, Bdv.—Common on the Rock of Gibraltar, at Tangier, and Benzús Bay, in June. In its habits it exactly resembles *O. antiqua*, flying actively by day.

*Ocneria dispar*, L.—Not common on the Rock of Gibraltar, and in the cork-woods of Almoraima, but observed in all its stages in most astonishing profusion at Monte de la Torre, about four miles from Algeçiras, on June 28th, 1888 (*vide* Entom. Monthly Mag., vol. xxv., p. 65).

*O. atlantica*, Ramb.—One female of this interesting species was found at rest on a stone wall at Gibraltar, July 5th, 1887.

*Porthesia auriflua*, L.—Not uncommon at Gibraltar and San Roque in June. The black dots on the primaries, occasionally developed in English examples, are very conspicuous in these specimens.

*Cossus ligniperda*, L.—Not common. The larva observed in elm and poplar trees at Campamento.

*Zeuzera æsculi*, L.—Found once on the Rock of Gibraltar, June 11th, 1887. A large and well-marked female specimen.

*Saturnia pyri*, L. — Apparently common throughout the region. I have had many specimens brought to me at Gibraltar in April and May, and have found the cocoons at Tangier in the winter. On June 28th, 1888, I observed the full-fed larvæ in large numbers on willow-bushes and fruit-trees at Algeçiras.

*S. carpini*, L. — Only met with in the cork-woods, where it is very abundant at the end of March (the earliest date on which I have seen it on the wing being the 6th). The larva is also common there in May on a variety of plants, but it appears to have a preference for the yellow-flowered *Helianthemum halimæfolium*.

*Lasiocampa trifolii*, L. — Not often seen on the wing, but common in the larva-state at Gibraltar and Tangier; at the latter place feeding chiefly on the single-seeded white broom, *Retama monosperma*, L. I have taken the male imago at gas-lamps in September at Gibraltar.

*Clisiocampa neustria*, L. — Common in the larva-state at Gibraltar, and near Algeçiras I have seen the oaks almost defoliated by the ravages of the larva in the beginning of June. The imago appears about the 20th of that month.

*Megasoma repandum*, Hübn. — This fine moth appears to be not uncommon at Gibraltar, also at Esmir, the larvæ feeding on various *Leguminosæ*. I found a female on the Rock of Gibraltar on August 6th, 1888, which laid a few eggs; the larvæ resulting from these fed up well on *Lotus*, and produced fine imagos in November. I also obtained a pupa at Esmir on March 1st, 1889, from which a very fine dark-coloured female emerged on the 20th of the same month.

*Pygæra bucephala*, L. — Found in the larva-state on oaks (*Quercus lusitanica*) near San Roque; also pupæ in the sandy soil at the foot of these trees. Imago bred March, 1888; these were very large and fine, the expanse of wings being quite 3 in. (76 mm.).

*Cerura vinula*, L. — The cocoons (mostly empty) of this moth were not rare on poplar-trunks at Tangier, but only one imago was bred (May, 1888). This is a small and very darkly suffused male, bearing a close resemblance to specimens of *D. menciæna*, Moore, from the Himalayas, in the National Collection.

*C. bifida*, L. — Occasionally found in the larva-state, or drying its wings on the trunks of poplar-trees, on the

Rock of Gibraltar, in August. These specimens are very dark, and are probably the var. *urocera*, Bdv.

*Raphia hybris*, Hübn.—Found once or twice drying its wings on poplar-trunks at Gibraltar in August, 1887, and at Campamento in April, 1888. The pupa was also found under bark of Lombardy poplar at San Roque in the winter of 1887–8.

*Acronycta psi*, L.—A larva of this species, found feeding on *Arbutus unedo* at Tangier in November, 1886, produced a very large and clearly marked imago in the following April.

*A. rumicis*, L.—Pupæ not uncommon, spun up on rushes, on the borders of the Esmir lagoon in winter, the imago appearing in February.

*Bryophila muralis*, Forst., var. *par*, Hübn.—Found at rest on walls and tree-trunks, Rock of Gibraltar, but scarce. July.

*B. ereptricula*, Treitschke.—More plentiful than the preceding, occurring on walls at Gibraltar and Campamento in August and September. The orange-spotted larva observed in the spring months.

*Tapinostola musculosa*, L.—Not common. Found on flowers of *Scabiosa*, *Centaurea*, &c., by the roadside near San Roque in May.

*Leucania Loreyi*, Dup.—Fairly common on ivy-blossom in the Alameda at Gibraltar in October.

*L. l-album*, L.—Occurs with the preceding, but much scarcer. October and November.

*Caradrina exigua*, Hübn.—Not rare at ivy-blossom, &c., at Gibraltar; also at Tangier. October, and again in spring.

*C. ambigua*, W. V.—Also on ivy-blossom in October, but less common than the preceding. Gibraltar.

*Pachnobia rubricosa*, W. V.—One specimen picked up at rest in the village of Campamento, in May, 1888. This is smaller and more obscurely marked, but more brightly coloured, than any British specimen I have seen.

*Orrhodia erythrocephala*, W. V.—I refer with considerable doubt to this species a moth taken on ivy-bloom at Gibraltar in October, 1887.

*Triphaena pronuba*, L.—Occurs throughout the summer, but can scarcely be called a common insect. Gibraltar and Tangier.

*Agrotis Dahlii*, Hübn.—Rare; on ivy-blossom at Gibraltar, November, 1887.

*A. saucia*, Hübn.—Not uncommon, and appears to be found almost all the year. Gibraltar and Tangier.

*A. leucogaster*, Freyer.—One specimen of this pretty species, bred from a pupa found in some flood-refuse near Tetuan. February, 1889.

*A. puta*, Hübn.—Not common. Taken at ivy-bloom at Gibraltar in October.

*A. segetum*, W. V.—A fairly common but not abundant insect, at ivy-bloom at Gibraltar. October and November.

*A. spinifera*, Hübn.—Found occasionally on the Rock at ivy-bloom in October, also met with in February; it is, however, more plentiful among coarse grass and herbage at La Tuñara, on the "Eastern Beach" (of the Mediterranean), three miles north of Gibraltar, in October. Some very richly-marked specimens were taken on the Tangier sand-hills in September, 1888.

*A. ypsilon*, Rott. (*suffusa*, Hübn.).—Not common; on ivy-blossom at Gibraltar, in October.

*A. crassa*, Hübn.—Rare; one or two worn specimens at light, and disturbed from among herbage, in September. Gibraltar.

*Brithys pancratii*, Cyr.—Not taken in the perfect state, but the conspicuous white-spotted black larvæ were abundant on the leaves of the beautiful and fragrant sea-lily (*Pancratium maritimum*, L.), which grows on every sandy beach throughout the region, just above the reach of the waves. These larvæ are to be found almost all the year round, and I bred the imago in November and February.

*Dryobota saportæ*, Dup.—A fairly common insect at Gibraltar on ivy-blossom. October and November.

*Mamestra serena*, W. V.—Once bred from a pupa picked up on the Rock of Gibraltar, March, 1888: a dark and suffused specimen closely approaching the var. *corsica*, Ramb.

*M. dysodea*, W. V.—One or two specimens found at rest on stones, &c., on the Rock. April.

*M. oleracea*, L.—Not common. Bred from pupa, also on ivy-blossom at Gibraltar, in October.

*Trigonophora flammea*, E.—A fine specimen, taken on ivy-bloom at Gibraltar, November, 1887.



*Habryntis meticulosa*, L.—Not rare, and found throughout the year, though most frequently seen on ivy-bloom. Gibraltar and Tangier.

*Eriopus Latreillei*, Dup.—The larvæ of this species were found feeding on ferns in a garden at Gibraltar, and several imagos were bred. October, 1887.

*Calocampa vetusta*, Hübn.—One specimen only, on ivy-bloom at Gibraltar, in October, 1887.

*Calophasia platyptera*, E.—One only, taken at Tangier, September, 1887.

*Cleophasia antirrhini*, Hübn.—San Roque. Found rarely on flowers by day. May, 1887.

*C. yvanii*, Dup.—Only once taken, in the cork-woods, in May, 1887.

*Cucullia verbasci*, L.—Not found in the perfect state, but the larvæ are common in May on *Verbascum sinuatum*, L., and other plants of this genus, throughout the Gibraltar district. Imago bred in April: very dark.

*C. chamomille*, W. V.—I have only one note of the occurrence of this species, in the larva-state at Gibraltar, March, 1887.

*Eurhipia adulatrix*, Bdv.—Apparently rare; one or two worn specimens taken at Gibraltar, and a fine example found in the sweeping-net, at Tangier, September, 1888.

*Heliothis armigera*, Hübn.—Not common. Found on the beach at La Tuñara, October, 1887.

*H. incarnata*, Fr.—Also scarce. One example in the cork-woods, May, 1887, and another near Algeçiras in July, 1888.

*H. peltigera*, W. V.—Tolerably common, at Gibraltar and Tangier, from May to July.

*Plusia chalcites*, E.—A specimen of this pretty species was bred from a pupa found in a garden at Gibraltar, October, 1888; it has also occurred there at light.

*P. gamma*, L.—Common, but not abundant, throughout the region; chiefly in the early spring months.

*Acontia luctuosa*, W. V.—Fairly plentiful in weedy places, and at flowers of wild mint and thyme by day, from May to September. Generally distributed.

*A. lucida*, Hübn., var. *albicollis*, F.—Rare; one at Campamento in May, 1887, and a beautiful specimen at Tangier in February, 1888.

*Catocala clocata*, E.—Several specimens of this species

were taken at rest on walls, &c., at Tangier, September, 1887 and 1888.

*C. dilecta*, Hübn.—A larva found feeding on *Quercus lusitanica* at Algeçiras on June 4th, 1888 (which, for want of a suitable box, I was obliged to carry on board the ship loose in my pocket), produced this fine moth on July 13th.

*C. promissa*, W. V.—Rare; one specimen taken at Monte de la Torre, near Algeçiras, June 28th, 1888.

*C. conversa*, E.—Common in June in the cork-woods, and near Algeçiras; usually at rest on the trunks of the cork-trees.

*C. nymphagoga*, E.—Found with the preceding; perhaps less common, but observed in numbers at Monte de la Torre on June 28th, 1888. [On this day I took a single specimen of a small *Catocala*, which I have as yet been unable to identify; but from its lacking the central black band on the yellow secondaries, it would appear to be referable to the American genus *Allotria*.]

*Cerocala scapulosa*, Bdv.—Found occasionally in sandy places in the cork-woods, flying by day among *Helianthemum halimæfolium*. April and May.

*Ophiusa bifasciata*, Petagna.—One specimen of this pretty and curiously marked moth was taken at Tangier, September 7th, 1888.

*O. algira*, L.—Also rare. Taken at San Roque, June 28th, 1887, and observed at Tangier.

*Pseudophia lunaris*, W. V.—Very abundant in the larva-state on low oak-bushes in the cork-woods in May. Imago less plentiful, but still not rare, and easily disturbed by day, in April. Bred March 13th, 1888.

*P. tirrhæa*, Cr.—A larva found feeding on a South American tree, *Schinus molle*, at Gibraltar in November, 1886, produced a fine female imago, February 21st, 1887.

*Spintherops spectrum*, F.—The very beautiful larvæ of this moth were not rare on a few bushes of *Retama* near the foot of the Sierra Carbonera in May. Some fine specimens bred, June, 1887.

*Emmilia trabealis*, Scop.—Apparently rare; found near Campamento, August 23rd, 1887.

*Prothymia conicephala*, Staud.—One specimen taken near San Roque, July 29th, 1887.

*Trothisa ostrina*, Hübn.—Generally distributed, and common in dry places. Found from April to October.

*T. parva*, Hübn.—Equally common with the preceding. Perhaps most plentiful in August.

*Metoptria monogramma*, Hübn.—A common species on the Rock of Gibraltar, and also observed at Malaga. It has the habits of an *Euclidia*, and flies actively by day among its food-plant, *Psoralea bituminosa*, L. April 14th to end of May.

*Herminia crinalis*, Tr. — Not uncommon at Gibraltar on ivy-blossom in October, but usually in worn condition.

*H. lividalis*, Hübn.—A common insect on the Rock of Gibraltar, and at Tangier, among weeds (*Parietaria*, &c.). June and October.

*H. obsitalis*, Hübn.—Not rare on the Rock; usually disturbed out of dark corners. September and October.

*Eugonia quercaria*, Hübn.—One specimen taken in the cork-woods, June 28th, 1887.

*Aspilates ochrearia*, Rossi.—Not uncommon at Gibraltar, and usually very large and fine. I have a male specimen taken in April, 1887, which measures 1 in. 6 lin. (= 38 mm.) in expanse.

? *Pseudosestra obtusaria* [*Lozogramma obtusaria*, Walk., Cat. Lep. Het., Geometrites, xxiii., p. 985 (1861)].—A single specimen of a Geometer, taken by beating the undergrowth in a stone-pine plantation about two miles north of San Roque on March 19th, 1888, is perhaps the most remarkable capture in the region, as it appears to be identical with *Lozogramma obtusaria*, described by Walker from New Zealand, and apparently not known from elsewhere. Of this moth there are eight examples in the National Collection, with which the San Roque insect agrees in all particulars, except that (being fresh and in good condition) it is rather brighter and more clearly marked than any of these specimens, all of which are slightly worn and faded. After a careful comparison of the Spanish insect with the New Zealand type by Mr. Butler and myself, we can come to no other conclusion than that they belong to one and the same species.

*Ligia opacaria*, Hübn.—Once taken in the cork-woods, among *Erica*, October 29th, 1887.

*Terpnomieta dilectaria*, Hübn.—One very small specimen, apparently of this species, at Tangier, in September, 1887.

*Abraxas pantaria*, L.—Exceedingly abundant in all its stages on the ash-trees in the Alameda at Gibraltar,

which are frequently stripped of their leaves by the prettily-coloured larvæ. It also occurs plentifully at San Roque, Esmir, &c.; in fact wherever there are ash-trees. The moths of the first brood, appearing in April, are much larger than those of the second brood, on the wing in July.

*Selidosema plumaria*, W. V.—Common throughout the summer and autumn at Campamento and San Roque, in dry bushy situations. Very much smaller than specimens from the South of England.

*Thamnonoma gesticularia*, Hübn.—A not uncommon species in the cork-woods in May and June; easily disturbed by day.

*Fidonia plumistaria*, Vill.—This handsome and conspicuous Geometer is not rare in some heathy localities in the cork-woods, flying in the hot sunshine in April; also on the summit of the Sierra Carbonera, where, in 1889, I met with it as early as March 26th.

*Gnophos respersaria*, Hübn.—Occasionally found in dry stony spots in the cork-woods in June. I have also seen it on the Rock.

*G. mucidaria*, Hübn.—Not rare on the Rock of Gibraltar, where it comes to the gas-lamps in October.

*Boarmia rhomboidaria*, W. V.—Taken at Algeçiras on June 28th, 1888. Apparently rare.

*Pachylenemia hippocastanaria*, Hübn.—Occasionally in heathy places in the cork-woods in May.

*Anthometra plumularia*, Bdv.—Not rare in June on the borders of the cork-woods, flying in the sunshine over low bushes of *Calycotome spinosa* and other thorny *Leguminosæ*.

*Nemoria herbaria*, Hübn.—One specimen taken at light at Gibraltar, October, 1888.

*Acidalia (Cleta) vittaria*, Hübn.—Taken at Algeçiras, flying by day, April 23rd, 1887; also near Campamento in June.

*A. ochrata*, Scop.—Plentiful in dry grassy places, near Campamento and elsewhere, in June.

*A. perochraria*, Rössl.—Found with the preceding, but less common. June.

*A. nexata*, Hübn.—This very minute but pretty Geometer is apparently not rare near Campamento, flying by day in moist places with *A. vittaria*. June and October.

*A. virgularia*, Hübn.—A very plentiful species on the Rock of Gibraltar, where it comes freely to gas-lamps. Most common in October.

*A. elongaria*, Ramb.—Rare; one specimen at Campamento, May, 1887.

*A. circuitaria*, Hübn.—I have an example of this species, taken at Benzús Bay in June, 1887.

*A. ostrinaria*, Hübn.—Occasionally taken in the cork-woods, in June.

? *A. transmutaria*, Ramb.—One specimen, apparently referable to this species, taken at San Roque, June, 1887.

*A. promutata*, Guén.—Found at rest occasionally on stones, &c., in July. Rock of Gibraltar.

*A. luridata*, Zell.—Taken at a gas-lamp at Gibraltar, September, 1887.

*A. emutaria*, Hübn.—Rare; one specimen at Esmir, November 3rd, 1888.

*A. imitaria*, Hübn.—Also rare; found on the Rock of Gibraltar, July 18th, 1887.

*A. ornata*, Scop.—Not rare, in dry flowery places at Campamento and San Roque, from May to August; also taken at Esmir.

*Pellonia calabraria*, Zell.—Tolerably common in the cork-woods, and on the Sierra Carbonera, at the end of April and in May; a day-flyer.

*Zonosoma pupillaria*, Hübn.—Beaten out of oak in the cork-woods in July, 1887.

*Z. porata*, F.—Rare; taken near San Roque in July, 1887.

*Sterrha sacraria*, L.—A generally abundant insect throughout the region, and found during the greater part of the year. Very variable.

*S. consecraria*, Ramb.—One specimen of this pretty little moth picked up in the town of Gibraltar, October 9th, 1888.

*Anaitis plagiata*, L.—Not uncommon on flowery banks near San Roque, in May and June; the specimens resembling those of the second brood in England.

*Chesias oblata*, F. (*obliquaria*, W. V.).—Apparently rare; taken at Campamento in March, 1888.

*C. griseata*, W. V.—Also a rarity; one found at Gibraltar in May, 1887.

*Ortholitha peribolata*, Hübn.—Not uncommon in the cork-woods, among *Erica*, on October 29th, 1887.



*Phibalapteryx fluviana*, Hübn. — Occasionally found singly, at almost all times of the year, at Gibraltar; also taken at Esmir, November, 1888.

*Larentia fluctuata*, L. — Our familiar "garden carpet" is by no means a common insect at Gibraltar, but it sometimes occurs at the gas-lamps, and at rest on walls, chiefly in the autumn months.

*L. basochesiata*, Dup. — Occasionally, but rarely, taken at gas-lamps, &c. One of the first moths noticed on the Rock of Gibraltar, October 23rd, 1886.

*L. bilineata*, L. — A scarce and local insect in the cork-woods. July.

*Eupithecia centaureata*, W. V. — Not uncommon at light, &c., on the Rock in spring and autumn.

*E. satyrata*, Hübn. — Occasionally found in the cork-woods, among heath. May and June.

*E. pumilata*, Hübn. — Tolerably common at Gibraltar in spring and autumn; also at Tangier in March. More uniform in colour than English specimens.

*Cledeobia connectalis*, Hübn. — Tolerably common in dry grassy places at Campamento and elsewhere. June.

*Stemmatophora gadesialis*, Ragonot. — One example, taken at San Roque, July, 1887.

*Scöparia angustea*, Steph. — At rest on walls, &c., Gibraltar and Campamento, in October; not rare.

*Hellula undalis*, F. — Taken in the Alameda at Gibraltar, August, 1887.

*Aporodes floralis*, Hübn. — Among wild mint at San Roque; scarce. July, 1887.

*Asopia glaucinalis*, L. — Rare; Gibraltar, in October, 1887.

*A. farinalis*, L. — Found with the preceding; also rare. October, 1887.

*Euryereon palealis*, Schiff. — Not common; among wild carrot at San Roque in May, 1887, and at Benzús Bay in June.

*Botys sanguinalis*, L. — Gibraltar; not rare on dry slopes on the Rock, April and May.

*B. (Mecyna) polygonalis*, L. — Scarce in the perfect state. The larva found commonly at the Sierra Carbonera on *Retama*, in company with that of *Spintherops spectrum*.

*Nomophila noctuella*, Schiff. — Generally common, especially in August.

*Margarodes unionalis*, Hübn.—Not rare at Gibraltar, at ivy-blossom and light in the autumn; also at Tangier and Bénézús Bay.

*Metasia suppandalis*, Hübn.—Taken amongst wild thyme at San Roque, June, 1888.

*Stenia brugierialis*, Dup.—At Campamento in September, 1887. Apparently rare.

*Myelophila cribrella*, Hübn.—Not uncommon among thistles, &c., at Campamento in May.

*Ancylolomia tentaculella*, Hübn.—In grassy places; at San Roque and Campamento, September and October.

In addition to the preceding one or two species of *Geometrae* and several *Pyrales* and *Crambites* still remain undetermined, being in most cases represented by single examples in indifferent condition.

I have to acknowledge the kind assistance afforded me by Mr. A. G. Butler and Mr. W. Warren in working out many of the more obscure and difficult species noticed in this paper.